

# PATENT COOPERATION TREATY

From the  
INTERNATIONAL SEARCHING AUTHORITY

## PCT

To:

see form PCT/ISA/220

### WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing  
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference  
see form PCT/ISA/220

**FOR FURTHER ACTION**  
See paragraph 2 below

International application No.  
PCT/EP2004/006238

International filing date (day/month/year)  
08.06.2004

Priority date (day/month/year)  
04.07.2003

International Patent Classification (IPC) or both national classification and IPC  
C22B19/04, C22B19/34, C22B5/10, C22B5/12, C22B5/16, C22B13/02

Applicant  
UMICORE

**1. This opinion contains indications relating to the following items:**

- ☒ Box No. I Basis of the opinion
- ☒ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

**2. FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

**3. For further details, see notes to Form PCT/ISA/220.**

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**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.  
PCT/EP2004/006238

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**Box No. I Basis of the opinion**

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1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.  
☐ This opinion has been established on the basis of a translation from the original language into the following language, which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
  - a. type of material:  
☐ a sequence listing  
☐ table(s) related to the sequence listing
  - b. format of material:  
☐ in written format  
☐ in computer readable form
  - c. time of filing/furnishing:  
☐ contained in the international application as filed.  
☐ filed together with the international application in computer readable form.  
☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.  
PCT/EP2004/006238

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**Box No. II Priority**

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1. ☒ The following document has not been furnished:
- ☒ copy of the earlier application whose priority has been claimed (Rule 43bis.1 and 66.7(a)).
  - ☐ translation of the earlier application whose priority has been claimed (Rule 43bis.1 and 66.7(b)).
- Consequently it has not been possible to consider the validity of the priority claim. This opinion has nevertheless been established on the assumption that the relevant date is the claimed priority date.
2. ☐ This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43bis.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.
3. Additional observations, if necessary:

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**Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

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1. Statement

Novelty (N)	Yes: Claims	1-12
	No: Claims	
Inventive step (IS)	Yes: Claims	1-12
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-12
	No: Claims	

2. Citations and explanations

**see separate sheet**

1. The application relates to a process for extracting metal values from Zn-, Fe- and Pb-bearing residues and involves (i) a direct reduction step producing a metallic Fe-bearing phase, (ii) an extraction of Zn and Pb from the thus obtained first fumes, (iii) an oxidising smelting step to produce an Fe-bearing slag and (iv) an extraction of metals from the thus obtained second fumes.

2. Reference is made to the following documents:

D1 = Heard R. et al, "Recycling of Zinc-Bearing Residues with the PRIMUS ® Process", Iron Steelmaker I and SM, Vol.30, Nr 4, April 2003, p.55-60

D2 = Esna-Ashari M and Kerney U, "Smelting Reactor for Recovering Zinc from Industrial Low Zinc Bearing Residues", Erzmetall 53 (2000), Nr 6, p. 373-384

D1 discloses the PRIMUS ® process whereby Zn-bearing residues are submitted to (i) direct reduction in a multiple hearth furnace (Fig.2) to produce a reduced Fe-bearing phase and Zn- and Pb-bearing fumes, (ii) extraction of the Zn- and Pb-bearing fumes for valorisation of Zn and Pb (paragraph bridging pages 58 and 59), (iii) melting of the Fe-bearing phase in an electric furnace, thereby producing both metal melt for the pig iron production and a slag suitable for road or building construction (page 59, middle and right columns) and (iv) extraction of offgases from the melting furnace for collection and cleaning in the primary exhaust line (page 60, left column, 3rd bullet).

D2 discloses a process for extracting metal values from Zn-, Fe- and Pb-bearing residues with the following steps: (i) smelting in a reactor in order to obtain an FeO-bearing phase and Zn- and Pb-fumes, (ii) an extraction of the Zn- and Pb-fumes via a settler placed below the smelting reactor into a waste heat boiler for collection in a bag house, (iii) an oxidising smelting with the help of lances in the settler to produce an Fe-bearing slag and (iv) an additional dezincing and deleading from further fumes originating in step (iii) (see "1. Process description" on pages 374-375 and Fig.1).

3. The process of present claim 1 differs from the PRIMUS ® process of D1 through the step (iii) of an oxidising smelting step to produce an Fe-bearing slag. In D1, the reduced iron is intended for pig iron production and not for its recovery in a slag phase.

The process also differs from that of D2 in that the step (i) is that of a direct reduction to produce metallic Fe-bearing phase. In D2 the smelting does not lead to a metallic Fe-bearing phase.

The subject matter of claim 1 and consequently of its dependent claims 2 to 12 therefore fulfills the requirement of novelty of Art.33(2) PCT.

4. The combination of the processes of D1 and D2 in order to obtain that of present claim 1 is not seen as obvious as these processes lead to different products.

Consequently, the subject matter of claims 1 to 12 is also seen to fulfill the requirement of inventive step of Art.33(3) PCT.